**Presentation title:**Chipless RFID Tag Design, Measurement, and Sensing for Nondestructive Evaluation (NDE) Applications

**Abstract:**Materials and structures are constantly subject to fatigue and degradation, and monitoring and maintaining civil, space, and aerospace infrastructure is an ongoing critical issue. As new materials, such as complex multilayer composites and additively manufactured (AM) components, come into wider use, the need to monitor their performance and overall health over time is also rapidly growing. Consequently, new and innovative nondestructive evaluation (NDE) and structural health monitoring (SHM) methods are needed in order to address this growing issue. To this end, wireless passive sensors are also of interest to the NDE and SHM

communities due to their small form factors, relative inexpensiveness, being minimally invasive (i.e., no power or communication hardware or wiring is required), and robustness in extreme environments. The work that is the subject of this presentation aims to address this need through the development of chipless RFID systems consisting of wireless passively-coded microwave sensors with supporting technologies and measurement methods, while also investigating the efficacy of chipless RFID technology outside of a laboratory setting. In conducting these works, novel contributions have been made in the areas of addressing chipless RFID measurement challenges, including mitigating the effects of tag/reader misalignment; developing more optimal tags for identification applications; creating unique wireless passive sensing approaches; developing tag performance assessment methods that consider measurement uncertainties; and providing a wholistic view on the practicality of this technology for NDE and SHM applications and beyond.